

What is claimed is:

1. A sensor cell for detecting gas comprising:
  - a substrate;
  - a sensing electrode in contact with said substrate for detecting gas;
  - dry ionomer membrane in contact with said substrate and said sensing electrode wherein said dry ionomer membrane acts as an electrolyte; and
  - an inlet through said substrate for keeping gas in contact with both said dry ionomer membrane and said sensing electrode.
2. The apparatus of claim 1 wherein said dry ionomer membrane is dry sheet Nafion®.
3. The apparatus of claim 1 wherein the sensor cell is assembled prior to wetting said dry ionomer membrane.
4. The apparatus of claim 1 further including a polymer layer positioned upon said sensing electrode for slowing inputs of gas moving through said inlet onto a surface of said sensing electrode.
5. The apparatus of claim 1 further including a counter electrode in contact with said dry ionomer membrane such that upon wetting said dry ionomer membrane said counter electrode provides an electrical connection to said ionomer membrane so current may be applied to said sensing electrode.
6. The apparatus of claim 1 further including a reference electrode in contact with said dry ionomer membrane such that upon wetting said dry ionomer membrane a reference point is created against which the potential of other electrodes can be measured.

7. The apparatus of claim 1 wherein the dry ionomer membrane is a perfluorosulfonic acid membrane.
8. A method of making an electrochemical sensor for the detection of an analyte in a gas sample comprising:
- a) providing a dry ionomer membrane free from liquid droplets;
  - b) providing a substrate with at least one opening through its surface and a first electrode layer adjacent to said opening;
  - c) connecting said dry ionomer membrane to said substrate;
  - d) aligning said at least one opening in said substrate with the first electrode for defining a gas passage; and
  - e) depositing a second electrode on said substrate for operatively connecting said ionomer membrane, said first electrode, and said second electrode.
9. The method of claim 8 wherein the step of providing a dry ionomer membrane further includes selecting dry sheet Nafion®.
10. The method of claim 8 further including making said sensor cell prior to wetting said dry ionomer membrane.
11. The method of claim 8 further including positioning a polymer layer upon said sensing electrode for slowing inputs of gas moving through said inlet onto a surface of said sensing electrode.
12. The method of claim 8 where the step of providing a substrate further includes positioning a counter electrode in contact with said dry ionomer membrane such that upon wetting said dry ionomer membrane said counter electrode provides an electrical connection to said ionomer membrane so current may be applied to said sensing electrode.

13. The method of claim 8 where the step of providing a substrate further includes positioning a reference electrode in contact with said dry ionomer membrane such that upon wetting said dry ionomer membrane a reference point is created against which the potential of other electrodes can be measured.

14. The method of claim 8 where the step of obtaining a dry ionomer membrane further includes obtaining a perfluorosulfonic acid membrane.

15. The method of claim 8 further comprising providing a reservoir in contact with said dry ionomer membrane.

16. The method of claim 15 further comprising filling said reservoir with a liquid.

17. The method of claim 15 comprising forming at least one hole in said dry ionomer membrane.

18. The method of claim 17 comprising aligning said at least one hole with the first electrode for defining a gas passage.

19. A method of making an electrochemical sensor for the detection of an analyte in a gas sample comprising:

- a) providing a dry ionomer membrane free from liquid droplets;
- b) forming at least one hole in said ionomer membrane;
- c) providing a substrate with a first electrode layer adjacent to said opening;
- d) connecting said dry ionomer membrane to said substrate;
- e) aligning said at least one hole with the first electrode for defining a gas passage; and
- f) depositing a second electrode on said substrate for operatively connecting said ionomer membrane, said first electrode, and said second electrode.